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HORTICULTURE IN THE ELEMENTARY SCHOOLS.

I.

NO RECENT development in the life of the middle West is of greater promise than the growing interest in scientific agriculture. This interest is no new thing. No thoughtful observer who knows the difference between good farming and bad, and who realizes the immense possibilities of our western soils, can fail to be stirred by an impulse to do something that will make for ampler knowledge and better methods. We had such an interest in Illinois fifty years ago. The brilliant discoveries of Sir William Lawes at Rothamstead and Liebig at Giessen had roused keen interest in agricultural chemistry. Our wisest men believed it was destined to revolutionize methods of farming. Largely through the leadership of Jonathan Turner, of Jacksonville, Congress was induced to pass the Morrill Act of 1862 endowing our agricultural colleges. The Civil War then engrossed the popular attention. After the war the rapid development of our railway systems brought into cultivation the fertile areas beyond the Mississippi. The competition of their cheap grain and cattle made farming unprofitable in all the older states. But we have now practically reached the limit of the agricultural area. Only by great irrigation works or by expensive drainage systems can any considerable additions be made to our arable lands. The populations fed from our American farms are increasing in numbers as fast as ever. Farming now must become intensive rather than extensive. Hence the present revival of interest in such farming is in response to a genuine economic demand. The attendance upon our agricultural colleges is rapidly increasing. Their bulletins are eagerly read by intelligent farmers. Their professors address vast audiences at the farmers' institutes. Our legislatures appropriate large sums for their support.

In this advance agriculture is moving in the same lines as all

other trades and professions. The apprentice system is dying. Modern civilization is not satisfied with the rule-of-thumb methods learned by imitation. It demands that all arts be rational arts intelligently based upon an underlying science, and has created the technical school to meet this demand. But not every farmer's son can attend the agricultural college. Nearly all must depend upon the literature issued by such institutions. The bulletins are often too technical to appeal to the average farmer; they often abound in scientific terms based upon distinctions of which he is ignorant. It is evident that the agricultural experiment station will never accomplish its purpose unless there is diffused among our farming population an elementary knowledge of the sciences relating to agriculture. The rural schools and the high schools attended by farmers' sons must provide the necessary instruction. There seems no other practical way.

The education of the farmer is of interest to the general public, that there may be juicier steaks upon the block or finer fleeces in the loom, or because upon the magnitude of his crops depend the volume of foreign trade and the business activity of the country. To the teacher, however, education merely to increase industrial efficiency does not make the strongest appeal. It is well that the farmer render a larger social service. It is better that he himself lead a more complete life—a life of many-sided interests and of realized capacity.

There is an idea widely prevalent that culture is to be found in the far-off and remote. The less practical value there is attached to any species of knowledge, the less likely is it to be acquired in the ordinary activities of life. Such knowledge, partly because of its rarity, partly because its uselessness for practical ends makes its possession a mark of conspicuous leisure, and hence a valuable appurtenance of the wealthier classes, comes to be regarded with almost superstitious veneration. Yet is it not probable that the same beautiful economy reigns here as in all the other works of the Creator, and that we do not need one species of knowledge for industrial efficiency and something totally different for the intellectual life?

The best culture invests the commonplace objects of our life with a halo of interesting associations, so that every contact with them calls forth an intellectual response. In my boyhood I heard much of Elihu Burritt, the learned blacksmith, who earned his title by mastering thirteen languages. But suppose he had instead gained a knowledge of iron; of the geological processes that had accumulated the great ore beds of the earth; of the differing properties of iron from these varying ores; of the effect of small admixtures of manganese, or nickel, or sulphur, or phosphorus, or carbon; of the different modes of smelting and working the metal from prehistoric times; of the myriad uses to which it is put; of the properties that make it useful whether in the armor or a war vessel, or in the blood corpuscle that circulates in the brain of the poet. Had he known all this and all related knowledge pertaining to his craft, its materials and products, would not the title have been more worthily bestowed?

Man should stand in the center of his world: he should see his own activities linked with all things about him. The best education for efficiency, for delight, for moral purpose, is the education that enables him to see his work related, on the one hand, to the natural elements, material forces, with which he works; on the other, to the humanity which he serves.

The school education of the farmer hitherto has consisted of instruction in reading, arithmetic, grammar, geography, and history, during the winter months. Ambitious school boards sometimes provide a nine-months' term. But it is gravely argued both by thoughtful teachers and by practical men that it is a serious mistake to take the child out of the woods and fields and away from the activities and responsibilities of a well-ordered farm for so long a time. Unless the school course can be enriched, more schooling is a mistake. What is needed in the schools is such instruction as will enable the farmer best to appreciate and love the country. The knowledge of soil and atmosphere, of plant and animal life, that makes him an intelligent producer puts him in sympathetic touch with these activities of nature.

In many European school systems the problem has found a solution. The organization of their schools has made it easy. Where teachers are well prepared for their work and hold their positions for life, where schools are in almost continuous session during the summer months, where the dwelling of the teacher is built by the state only a few rods from the schoolhouse, the school garden, which is also the kitchen garden and flower garden of the schoolmaster, provides abundant opportunities for experiment and instruction. With us such a school garden seems an almost hopeless project. The ignorance of our teachers, the weeds that run riot in our school yards during the long summer vacations, the annual changes of position in our rural schools, the vandalism of tramps and thoughtless boys, all seem to veto effectively in this country adoption of the plans that have yielded such admirable results in Europe.

Hitherto our nature study has lacked practical purpose. Where most intelligently organized, it has aimed to give at best only a knowledge of the processes of plant life, the various structures that aid in these processes, and the adjustments of the various living forms to their special environment. The student is brought to some extent to see the meaning of natural phenomena, the purpose of special features, and sometimes the efficient causes that produce them. That our interest has been mainly intellectual rather than practical appears in the fact that we have preferred to study nature where her processes have not been interfered with or directed by man, rather than to study her behavior under such direction.

The want of practical aim is largely responsible for the want of organization and method in our nature-study courses, and the low place it holds in the popular esteem. It is commonly enumerated in the list of fads by the Philistines; even among teachers its most zealous advocates are obliged to confess their disappointment in the results hitherto achieved.

The instruction in our elementary schools must accomplish at least three ends:

1. It must stimulate the instinctive love of plant and flower.
2. It must impart a knowledge of the laws and needs of plant-

growth, both in a state of nature and under the somewhat artificial conditions of farm and garden.

3. It must accustom the child to act upon the promptings that this knowledge will arouse.

These ends can be accomplished in our rural schools, even under our present organization of the school year, if we can secure teachers who know and love the work. It is idle to expect satisfactory results from the mere use of a text-book or from oral lessons by the teacher. Even in the country the children have made few careful observations. Their notions of natural phenomena are vague and indefinite, largely derived from hearsay and colored by prevailing superstitions. There must be outdoor work, and, to accomplish the ends named above, there must be the personal care of growing plants to which the sense of ownership brings added interest and responsibility. Even if the ultimate end of the study is a better agriculture, it is not best to deal exclusively or even mainly with the cereals or forage crops of the farm. The valuable ends can all be secured in the cultivation of flowers and fruits; they are in themselves of greater interest to the children, and offer a greater variety of features for study. The cultivation of flowers does not present so many problems as the propagation and care of fruit trees; but it yields quick returns and appeals more strongly to the interests of children.

Under American school conditions the success of the teacher must depend very largely upon the extent to which he secures the co-operation of the parents in promoting the home gardens of the children. He can interest the children in the work, show how some of it can be done, and give directions for the rest. He probably will be able to show few finished products of the school garden itself. Even if the school garden could be carried on under as favorable conditions as in Germany, it would still be better to interest the children in the beautifying of their own homes through their individual efforts.

The teacher will start a window garden in September, knowing that his geraniums, petunias, salvias, and primroses will perish before Christmas. But the flowers that are started by the

children at home need not freeze. He will teach them how to prepare the soil for the pots or boxes, how to water the plants, to cleanse them from dust, to combat plant lice or fungi. By means of his starting boxes in April he will illustrate proper methods of handling soil and seed to avoid the "damps" and blights that vex the soul of the inexperienced. In the school garden will be found a variety of hardy annuals and an assortment of hybrid roses, cannas, gladioli, and other flowers that need especial attention for the winter. In many localities public sentiment will soon repress vacation vandalism, and see to it that the school garden is not neglected during the summer. Yet even under the most discouraging circumstances it can serve for illustration and instruction in methods of culture. Children may easily be taught budding, grafting, and other modes of propagating fruit trees. Seedlings may be grown at home and at school, the root-grafting at least may be done at school, the grafted stocks set out at home. Better trees can be bought of the nurseryman, but who would ignore the difference to the child?

Along with this plant-study will come a mass of tributary knowledge. The study of soils to determine their behavior toward water, the effects of drainage, the conditions of germination; simple experiments to make clear the necessity of soluble nitrates, potash, and phosphoric acid; the insect life of garden and orchard; the birds and bats, the toads that prey upon it—all are seen in vital relation to the practical activities in which the child is engaged. It need in no way diminish the extent of the course in nature study to give it this practical center about which other knowledge is organized. It has been the method of instruction in the education of the race. The bulk of our knowledge of nature has been discovered and preserved only as it served practical ends.

Horticulture can find a place in our schools only as our teachers become interested and qualified. No normal school should be without an extensive school garden and greenhouse in the hands of a competent florist; its work in biology should deal less with the minute anatomy of tissues, more with the

interrelations of living forms and their environment; and the student should acquire personal acquaintance with the art of the florist and gardener.

Thousands of American farm homes are without flowers in dooryard and garden. The apple, peach, and cherry are, in a majority of cases, the only fruits in the orchard. This condition is not because all the household are overworked. It is not because of indifference. It is usually due to simple ignorance of what to do. The game is surely worth the candle.

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